

Remarks/Arguments:

Applicants' provide the following remarks in response to the Office Action mailed on October 20, 2003, in parent U.S. Patent Application No. 10/008,664.

Claims 1, 3-5, 8, 9, and 11-14 are pending in the present application. Claims 2, 6, 7, and 10 have been cancelled without prejudice of the subject matter disclosed therein.

Objections to the Specification and Claims

The specification has been objected to under 37 C.F.R. § 1.75(d)(1) and MPEP § 608.01(o) as "failing to provide proper antecedent basis for the claimed subject matter." More specifically, the Office Action provides that "[i]t is unclear where applicant describes the subject matter of the claimed articles with all claimed limitations, no more and no fewer, in the original [s]pecification." Applicants are not clear which claim or claims have been objected to, and as such, Applicants address independent claim 1. The present version of claim 1 (amended herein) is similar to the combination of originally filed claim 1 (which provides that an outer shell of the molded body is solidified outside of thermal equilibrium), originally filed claim 2 (which provided that the molded body is solidified in the core stably), and originally filed claim 8 (which provides that the molded body is a roll barrel for processing a web-shaped material). These originally filed claims are part of the original disclosure and provide antecedent basis for the claimed subject matter. Thus, Applicants respectfully submit that the claims are properly supported and described in the originally filed application.

Claims 3 and 11 stand objected to under 37 C.F.R. § 1.75(c). Claims 2 and 10 (i.e., claims 3 and 11 from the parent application) have been cancelled, and as such, the objection is moot.

Rejections under 35 U.S.C. § 112

Claims 1, 3-13, 28, and 29 stand rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. More specifically, regarding claim 1, the Office Action indicates that "it is unclear where the [s]pecification teaches the subject matter of the phrase, 'the metal alloy being chilled in said outer shell in its crystal lattice by

rapid cooling,' absent the requirement of a supersaturated alloy composition, as described in original [c]laim 14, for example." Applicants respectfully submit that the originally filed specification teaches this feature in a plurality of locations, for example, at: (a) page 12, lines 9-21 (providing that "[i]n the cooled casting die 2, the molten mass solidifies at the surface . . . it is rapidly cooled wherein carbides are precipitated in a finely dispersed distribution, and the fine granular structure is chilled in, within an outer shell of the billet and later molded body."), and (b) page 11, lines 1-7 (providing that "effective quenchants on the surface of the billet, supercooling, nucleation and crystallization of the molten mass may be influenced in such a way that alloys arise well outside of thermodynamic equilibrium.").

Claims 1, 3-13, 28, and 29 stand rejected under 35 U.S.C. § 112, second paragraph as being indefinite. Regarding claim 3, the Office Action indicates that "it would appear that the metal alloy of [c]laim 1 is necessarily implicitly a 'casting alloy'." Claim 2 (i.e., claim 3 from the parent application) has been cancelled, and as such, the rejection is moot. Regarding claim 11, the Office Action indicates that "it would appear that [c]laim 1 demands that a single metal alloy is cast." Claim 10 (i.e., claim 11 from the parent application) has been cancelled, and as such, the rejection is moot.

Regarding claim 1, the Office Action provides that "it is unclear what is meant by the phrase, 'gradient material molded body'." Claim 1 has been amended to recite a roll barrel for processing a web-shaped material. The rejected language has been omitted from claim 1.

Rejections under 35 U.S.C. §§ 102/103

Claims 1, 3-5, 7, 8, and 10-12, and 29 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Schrewe ("Continuous Casting of Steel"). Claims 1, 3-8, 10-12, 29 and 30 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Thomé (U.S. Patent No. 4,602,416). Claim 9 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Thomé.

By the present amendment, the claims have been amended to clearly recite a roll barrel for processing a web-shaped material. Applicants note that neither Schrewe nor Thomé directly relate to such an apparatus.

Regarding Schrewe, the Office Action indicates:

Schrewe describes a core that is distinct from the outer shell. The claim requires a 'stable core,' not a global thermodynamic minimum. It would appear that the core is stable in that the steel sheet is a stable material.

Schrewe does disclose a casting structure that consists of three zones (i.e., a fine globulitic shell zone, a columnar crystal zone, and a globulitic core zone; however, in describing a continuously cast slab, Schrewe indicates that "[s]teel preferably solidifies dendritically." Schrewe makes no distinction between the three zones regarding dendritical solidification. Dendritical solidification is typical for metastable structures. Such a metastable structure (i.e., a structure which readily changes to a more stable condition, or readily changes to a less stable condition) is very different from the stable core recited in claim 1 of the present application.

Regarding Thomé, the Office Action indicates that "Thomé teaches a crushing bar . . . having a distinct core and surface regions, where the surface region is comprised of a metastable material." However, the Office Action indicates that "[i]n that the bar is a stable material, the 'solidified in the core stably' limitation is satisfied." Applicants respectfully disagree. Thomé makes clear that the crushing bar has "a core with [a] radially oriented dendritic structure." As provided above with respect to Schrewe, dendritic structures are typically metastable structures.

Further, Thomé makes clear that the "crushing bar is made from a steel with a high carbon content and a high carbide percentage." (See column 2, lines 52-54). Thus, in direct contrast to the stably solidified core recited in claim 1 of the present application, Thomé discloses a standard continuous casting process for a steel alloy which is metastably solidified in the core. Such a process results in a core having a "radial dendritic structure" which is sufficiently frangible/breakable (See column 3, lines 31-37). Such a core structure, while appropriate for certain crushing bars, is not appropriate for roll barrels for processing web-shaped materials, as recited in claim 1 of the present application.

In short, the material of the crushing bar of Thomé solidifies metastably and exhibits a metastable structure. On the other hand, claim 1 of the present application recites that the metal alloy is solidified in the core stably. If the rejection of claim 1 in view of Thomé is maintained, Applicants respectfully request that the Examiner cite any disclosure in Thomé of a stably solidified core.

Further still, while Thomé does disclose controlled cooling after solidification (See column 3, lines 57-66), Thomé includes no disclosure of rapid cooling of the outer shell of the roll barrel, as recited in claim 1 of the present application.

Thus, claim 1 is clearly distinguished from Schrewe and Thomé. By providing the structure recited in claim 1, a roll barrel is provided having a hard, wear resistant surface, and a comparably softer core.

Accordingly, for the reasons set forth above, claim 1 is patentable over the art of record. Dependent claims 3-5, 8, 9, and 11-14 include each of the features of independent claim 1 from which they depend, either directly or indirectly. Thus, dependent claims 3-5, 8, 9, and 11-14 are also patentable over the art of record for the reasons set forth above.

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



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